

## Abstracts

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specific quality criteria developed by the authors. **RESULTS:** We found 45 comparative studies in 43 publications. Asthma (14 studies) and psychiatric illness (12 studies) were most commonly investigated. In 33 studies, interventions were educational, 20 had multiple components and 23 did not appear to be linked to proven reasons for non-adherence. No studies assessed management of unintentional non-adherence. No study met all quality criteria. Study quality has not improved with time, as some better studies are over ten years old. Many studies used inadequate or unidentifiable adherence measures. Critically, many were too small or not randomised. All studies assumed that patients were prescribed appropriate therapy for their condition, and no assessment of treatment quality was made by any study. Reporting of adherence and outcome results was often unclear. Cost data were poorer quality than outcome data, using average or estimated costs and omitting some cost elements. Nine studies carried out incremental economic analysis. **CONCLUSIONS:** We were not able to make definitive conclusions about the cost-effectiveness of medication adherence enhancing interventions due to the heterogeneity of the studies found and incomplete reporting of results. Important policy decisions need to be made about non-adherence, however, they are currently being made in a vacuum of adequate information. Medication adherence-enhancing interventions must be based on reasons for non-adherence and be evaluated using accepted clinical and economic quality criteria.

## PHP2

**THE MEDINET-PROJECT—A FEASIBILITY STUDY ON MEDICATION COMPLIANCE UNDER REAL LIFE CONDITIONS**

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**OBJECTIVES:** To study medication compliance patterns regarding dosing, timing and adherence under real life conditions. Using a new electronic blister pack system. **METHODS:** A total of 37 volunteers from three study centers were each furnished with an electronic blister holder (“monitor”) and three blister packs containing 14 placebo capsules each (trial duration: six-weeks). The monitor measured the disruption of conductive lines printed on aluminum carrier foil under each capsule and stored this information (date and time) for evaluation at the end of the study. Patients had to take out one capsule daily in the morning over the entire study period. Also patients received a CRF and a radio-controlled clock such that date and time of the event could be manually recorded by the patient as well. Data were considered accurate if the information stored in the monitor and the corresponding CRF entries were within a time window of  $\pm 15$  min. **RESULTS:** All recordings of the electronically stored information matched the data documented on the CRFs. This indicates the accurate documentation of the volunteers, as well as the correct functioning of the monitors. Evaluation of the data, however, showed a wide intra—as well as interindividual variation in the time patterns of the volunteers. Three clusters of time preference were detected—mornings, noon and late night. Further, periods of non-compliance (“drug holidays”) as well as lack of adherence (discontinuation of medication before the end of the study period of six-weeks) could be documented. **CONCLUSIONS:** The use of the new electronic blister system improves compliance measurement under real life conditions. Combining compliance information with other outcome parameters will help in better quantifying and optimizing the impact of patient compliance on clinical and economic outcomes under real life conditions.

## PHP3

**IMPACT OF INCREASED COPAYMENTS ON THE SWITCHING AND DISCONTINUATION RATES FOR NON FORMULARY MEDICATIONS**

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**OBJECTIVE:** Chronic disease sufferers are particularly affected by prescription copayment increases as they are faced with decisions to switch to formulary alternatives or pay more to stay on their current medication. The objective of this study was to evaluate the impact of increased prescription copayments as a result of a change in formulary status on continuation rates of non formulary medications in multi-tiered pharmacy benefit plans. **METHODS:** Retrospective cohort study of chronic disease patients from a health plan in the Western U.S. Individuals were selected who were taking a medication that was being removed from the health plan's formulary and thus experienced increases in their copayments for non formulary medications ( $n = 1244$ ). Two time periods were studied: the “pre” period before and the “post” period after the increase in copayments. Adjusting for demographics, chronic co-morbidities, medication use, Medicare + Choice status and percentage increase in copayment for non formulary medications, Cox regressions were used to assess continuation rates for these medications. **RESULTS:** A clear relationship between increasing copayment differentials and continuation rates for non formulary medications in the post period could not be established. In general those who experienced higher copayment differentials (between 50–100%, 100–200% and greater than 200%) were more likely to continue their non formulary medication than those who experienced copayment increases of 25–50% and less than 25%. **CONCLUSIONS:** Individuals confronted with increased copayments often switched their medications to formulary alternatives. However, a clear relationship could not be established between increasing copayments and continuation behavior. Further research is needed to determine if these switching behaviors results in inappropriate medication behaviors such as complete discontinuation of drug therapy due to the increased costs.

## PHP4

**IMPACT OF COST ON MEDICATION COMPLIANCE IN PATIENTS WITH DIFFERENT LEVELS OF PERCEIVED BENEFITS**

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**OBJECTIVES:** The economics theory of consumer behavior suggests that the impact of cost on product purchasing decisions depends on the perceived benefits associated with that product. However, this relationship has been neither demonstrated nor quantified for patients taking chronic medications. The objective of this study was thus to analyze the impact of cost on medication compliance (refills) among groups of individuals with different levels of perceived benefits. **METHODS:** Patients new to statin therapy were identified from the prescription database of a national retail chain. The perceived benefit of the statin medication was measured on a scale of one (low) to seven (high) by surveying randomly selected new patients. Compliance with the medication regimen during the first 12 months of statin therapy was measured in terms of the Medication Possession Ratio (MPR). Information on cost and (MPR) on randomly selected patients was obtained from the retail chain prescription data-

base. Data was analyzed using a CHAID (Chi-square automatic interaction detection) technique. **RESULTS:** The average MPR of the sampled population ( $n = 181$ ) was 0.62. CHAID analysis segmented the sample into groups at a perceived benefit value of 3.85 and a cost of \$19.50. Patients with a perceived benefit below 3.85 had a significantly lower MPR (0.26,  $p < 0.000$ ) than patients with a perceived benefit over 3.85 (MPR = 0.66). Among patients in the higher perceived benefit group, those paying more than \$19.50 per prescription had a significantly lower MPR (0.54,  $p < 0.000$ ) than patients paying less than \$19.50 (MPR = 0.78). However, cost had no impact among patients with a lower perceived benefit. **CONCLUSIONS:** Perceived benefit and cost significantly affected medication compliance. Individuals with a high perceived benefit were further impacted by cost; no such effect was observed in individuals with low perceived benefit.

#### PHPS

##### TOOLS TO INCREASE THE APPROPRIATENESS OF ALBUMIN UTILIZATION IN AN ITALIAN COMMUNITY HOSPITAL

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**OBJECTIVES:** To rationalize the clinical use of albumin in order to reduce inappropriate subadministration and minimize costs in a 300-beds community hospital. **METHODS:** A multidisciplinary team composed by the Chief Medical Officer, the Intensive Care Unit Director, the Immunostransfusional Unit Director, the Pharmacy Director, elaborated a clinical practice protocol on the prescription of albumin and a specific form for it request to Farmacy. Clinical indications for albumin use were defined according to a method which combined a review of the medical literature with experts points of view. First choice criteria were paracentesis, bacterial peritonitis, plasmapheresis, liver-kidney disease, liver transplant; second choice criteria were hypovolaemia, burns, haemolitical neonatal syndrome. Protocol dissemination and implementation started in October, 2003. The method for assessing the impact was a pre-post analysis of the discrepancies between recommendations and clinical practice (2003-first semester versus 2004-first semester). Results were tested by chi-square test ( $X^2$ ). **RESULTS:** A 55% decrease in 100 g/l-phials of albumin prescription was found in 2004 with respect to 2003 ( $X^2 = 211.92$ ;  $df = 1$ ;  $p < 0.001$ ). In particular the 25 g/l- threshold for subadministration was respected in 75.3% cases in all. Significant reduction of inappropriate utilization was found in cirrosis patients ( $X^2 = 22.28$ ;  $df = 1$ ;  $p < 0.001$ ), hypoalbuminaemia conditions ( $X^2 = 23.31$ ;  $df = 1$ ;  $p < 0.005$ ) and haedema impairment ( $X^2 = 87.09$ ;  $df = 1$ ;  $p < 0.001$ ). The expenditure for albumin decrease from 48.910€ (\$65,510.05) to 21.629€ (\$28,969.88) without any negative outcomes referred. **CONCLUSION:** Shared multidisciplinary protocol significantly improved appropriateness of albumin utilization and expenditure rationalization preserving positive outcome. It appeared to be a simple health technology that improved hospital efficiency in a short time. Multidisciplinary and sharing of information are supposed to be the key tools for this success.

#### PHP6

##### SUMMARIZING DRUG USE OVER TIME: THE DRUG-O-GRAM

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**OBJECTIVE:** To describe a visually-friendly approach (Drug-O-Gram) for summarizing patterns of drug use over time using medications to treat two common disease conditions—arthritis and hypertension. **METHODS:** Administrative claims data

(Medstat MarketScan) was used to identify hypertensive patients newly treated with diuretics, angiotensin-receptor blockers [ARB], or calcium-channel blockers [CCB]; and arthritis patients newly treated with cyclooxygenase-2 [COX-2] inhibitors or traditional non-steroidal anti-inflammatory drugs [NSAID]). Patients were then classified according to medication class use during each subsequent day for one year. The Drug-O-Gram plots the distribution of drug use over the follow-up period. Statistical smoothing was applied to the plots to help visualize trends over time. Superimposed on the plots are plots of outpatient medical costs impacted by medication use. **RESULTS:** Among patients with hypertension, the percent of days on medication was higher for ARBs (65%) compared to CCBs (59%) and diuretics (48%). Additionally, outpatient medical payments for ARB patients were 69% of diuretic and 56% of CCB outpatient payments. Among patients with arthritis, discontinuation was faster and persistency worse for traditional NSAIDs than for the COX-2 inhibitors. **CONCLUSIONS:** The Drug-O-Gram graphically summarizes drug use over time by fitting graphical smooths to daily averages. It then stacks these graphs to visualize changes between medications. These plots convey more detail of drug use patterns than commonly used discontinuation and switching rates. Areas under the plots can be used to quantify and analyze the amounts and changes of drug use over time. By superimposing daily plots of other outcomes, one can assess their relationship to drug use.

#### PHP7

##### PRESCRIPTION DRUG NONCOMPLIANCE AMONG TRICARE BENEFICIARIES AT MILITARY PHARMACIES

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**OBJECTIVES:** To examine the prevalence of drug noncompliance among TRICARE beneficiaries, the reasons for it, costs associated with unclaimed prescriptions, and how pharmacy features influence compliance in the Military Health System (MHS). **METHODS:** We conducted interviews with staff at six pharmacies, a telephone survey of 1214 TRICARE beneficiaries, and analysis of pharmacy data. Pharmacy interviews provided information on the average level of noncompliance and features distinctive to each site. We asked beneficiaries to report on their prescription compliance in the year prior to the survey and reasons for noncompliance. We used claims data to examine utilization among noncompliers and the direct cost of unclaimed prescriptions. **RESULTS:** After weighting survey responses at the six study pharmacies, approximately 8% of beneficiaries failed to pick up at least one prescription in the year before the survey. Noncompliance was most prevalent among young, active duty personnel and less so among older, retired beneficiaries. Non-compliers were more likely than compliers to have had an emergency room visit in the last year (12.3% versus 6.6%). The total annual estimated costs of unclaimed prescriptions in additional labor and discarded drugs is roughly \$50,000, per 1,000,000 beneficiaries. The most common reasons for non-compliance included long wait times at the pharmacy (11.1% of non-compliers), the perception that the prescription was not needed (18.5%), and patient forgetfulness (17.3%). The primary pharmacy features that influence noncompliance include long wait times, the dispensing process used at the pharmacy, patient reminder calls, and providers not receiving automated messages about non-compliant prescriptions. **CONCLUSION:** Policy rec-